

Appln No. 09/878,054

Amdt date June 14, 2004

Reply to Office action of December 18, 2003

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A crosspoint switch unit comprising:

~~a switch matrix module comprising:~~

~~a first element including a semiconductor substrate with a plurality of active elements and a plurality of programmable registers corresponding to the plurality of active elements; and~~

84 ~~a second element coupled to the first element and including a first conducting layer having a pattern forming multiple first set of transmission lines and a second conducting layer having a pattern forming multiple second set of transmission lines, the second set of transmission lines being orthogonal to the first set of transmission lines, with an insulating layer separating the first conducting layer and the second conducting layer; and~~

~~a crosspoint switch comprising:~~

~~a plurality of programmable registers coupled to the plurality of active elements;~~

wherein each active element of the plurality of active elements is coupled to one transmission line of the first set of transmission lines and to one transmission line of the second set of transmission lines by through a tap.

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2. (Currently Amended) The crosspoint switch unit of claim 1 wherein the tap is a via-hole.

3. (Currently Amended) The crosspoint switch unit of claim 21 wherein the transmission lines narrow about the ~~via~~ ~~further comprising a secondary substrate coupled to the~~ ~~second element.~~

4. (Original) The crosspoint switch unit of claim 1 wherein the switch matrix module includes inputs coupled to the first set of transmission lines and outputs coupled to the second set of transmission lines.

B4 5. (Original) The crosspoint switch unit of claim 4 wherein the inputs and outputs are coupled to pads of a printed circuit board via a ball grid array.

6. (Original) The crosspoint switch unit of claim 4 further comprising a second switch matrix module including inputs and outputs, the inputs of the second switch matrix module being coupled to the outputs of the switch matrix module.

7. (Original) The crosspoint switch unit of claim 1 further comprising a passive network coupled to a plurality of transmission lines of the first set of transmission lines.

8. (Original) The crosspoint switch unit of claim 7 wherein the passive network includes capacitors and resistors tuned to compensate for signal degradation prior to the first set of transmission lines.

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9. (Original) The crosspoint switch unit of claim 7 wherein the passive network includes a resistor and a capacitor in parallel on each of lines of a differential signal with a register coupling the lines.

10. (Original) The crosspoint switch unit of claim 7 wherein the network is external with respect to the switch matrix module.

11. (Original) The crosspoint switch unit of claim 7 wherein the network is embedded in the same die of integrated circuit as the switch matrix module.

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12. (Original) The crosspoint switch unit of claim 7 wherein the network provides decreased signal attenuation at higher frequencies.

13. (Currently Amended) The crosspoint switch unit of claim 1 ~~wherein the crosspoint switch further comprising~~comprises:

a programming interface coupled to the switch core;
and

output drive level registers setting output drive levels of outputs of the switch matrix, as commanded by the programming interface.

14. (Currently Amended) The crosspoint switch unit of claim 1 ~~wherein the crosspoint switch further comprises~~comprising:

a programming interface coupled to the switch core;
and

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output drive level registers coupled to the outputs of the switch core and controlling output levels of outputs of the switch core.

15. (Original) The crosspoint switch unit of claim 14 further comprising:

a primary access port coupled to the programming interface and providing instructions to the programming interface; and

a secondary access port coupled to the programming interface and utilized while the primary access port is in use.

16. (Original) The crosspoint switch unit of claim 14 further comprising:

user registers coupled to the switch matrix module and storing programming data provided by the programming interface;

wherein the programming data includes mapping information regarding interconnections of inputs to outputs of the switch matrix module, as specified by a user.

17. (Original) The crosspoint switch unit of claim 14 further comprising:

staging registers coupled to the switch core;

wherein the programming interface stores programming data previously stored in the staging registers and provides the programming data to the staging registers at a later time.

18. (Original) The crosspoint switch unit of claim 14 wherein the programming interface is configured to provide programming data that associates consecutive outputs to inputs as specified by the programming interface.

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19. (Currently Amended) The crosspoint switch unit of claim 14 wherein the programming interface is configured to group inputs and outputs ~~of the switch matrix module.~~

20. (Original) The crosspoint switch unit of claim 17 wherein the programming interface associates the groups of the inputs to the groups of the outputs.

21. (Original) The crosspoint switch unit of claim 18 wherein the inputs and outputs are grouped based on numerical ordering of the inputs and outputs.

22. (Original) The crosspoint switch unit of claim 19 wherein the inputs and outputs are grouped based on placement of inputs and outputs with respect to the switch core.

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23. (Currently Amended) The unit of claim 1 wherein the insulating layer is an insulating laminate ~~separating the first set of transmission lines and the second set of transmission lines.~~

24. (Previously Presented) The unit of claim 7 wherein the plurality of transmission lines of the first set of transmission lines comprises a differential signal path.

25. (Previously Presented) The unit of claim 24 wherein the differential signal path comprises a first transmission line and a second transmission line, and the passive network comprises a series resistance and a series capacitance in each of the first and second transmission lines and a shunt resistor connecting the first transmission line and the second transmission line.

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26. (Currently Amended) A crosspoint switch unit comprising:

a first set of transmission lines;

a second set of transmission lines selectively coupled to the first set of transmission lines;

an amplifier chain coupled to the first set of transmission lines; and

a passive network coupled to the amplifier chain;

wherein the amplifier chain comprises a differential signal path having a first signal path and a second signal path and wherein the passive network comprises:

a first capacitance;

a second capacitance;

a first resistance;

a second resistance;

wherein the first resistance is coupled to the first capacitance in a first series path and the second resistance is coupled to the second capacitance in a second series path with the first series path coupled to the first signal path and the second series path coupled to the second signal path; and

a shunt resistance with predetermined resistance shunting the first series path to the second series path;

wherein the first and second resistance, the first and second capacitance and the shunt resistance are fabricated on a monolithic integrated circuit substrate, and at least one of the first and second resistance, the first and second capacitance and the shunt resistance is one of segmented, programmable, and a combination thereof; and

wherein an impedance of the at least one of the first and second resistance, the first and second capacitance and the

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shunt resistance is selectable after being fabricated on the monolithic integrated circuit substrate.

27. (Cancelled)

28. (Cancelled)

29. (Cancelled)

30. (Currently Amended) The unit of claim ~~2629~~ wherein an impedance corresponding to the first capacitance at a first corner frequency is approximately equal to an impedance corresponding to the first resistance and the impedance corresponding to the first capacitance at a second corner frequency is approximately equal to an impedance corresponding to the predetermined resistance of the shunt resistance.

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31. (Previously Presented) The unit of claim 30 wherein the impedance corresponding to the first capacitance is greater than the impedance corresponding to the first resistance at low frequencies generally less than the first corner frequency, and the impedance corresponding to the first capacitance is greater than the impedance corresponding to the shunt resistance at high frequencies generally greater than the second corner frequency.

32. (Currently Amended) The unit of claim 30 wherein the impedance corresponding to the first capacitance is approximately defined at the low frequencies by the relationship between the predetermined resistance of the shunt resistance, R_P , and resistance of the first resistance and the second resistance, $RS1$ and $RS2$:

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$$\frac{RP}{(RP + RS1 + RS2)}; \text{ and}$$

the impedance corresponding to the first capacitance is approximately unity at higher frequencies.

33. (Previously Presented) The unit of claim 30 wherein the amplifier chain has a frequency response in a passband from the first corner frequency to the second corner frequency, wherein impedance values corresponding to the first capacitance in the passband is representative of a precompensation network frequency response, and wherein the precompensation network frequency response is approximately the inverse of the frequency response of the amplifier chain.

34. (Cancelled)

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35. (Currently Amended) A crosspoint switch unit comprising:

a switch module; and

a passive network having a predefined precompensation frequency response and coupled to the switch module;

wherein the passive network comprises:

two series capacitors, each having a capacitance value approximately equal to a predefined capacitance value;

two series resistors, each having a resistance value approximately equal to a predefined series resistance value;

a shunt resistor having a resistance value approximately equal to a predefined shunt resistance value;

wherein one of the two series resistors is coupled to one of the two series capacitors in a first series path and another

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one of the two series resistors is coupled to another one of the two series capacitors in a second series path;

wherein the first series path is parallel to the second series path and wherein shunt resistor shunts the first series path to the second series path;

wherein the first series path is coupled to a first differential signal path and the second series path is coupled to a second differential signal path; and

wherein at least one of the two series resistors, the two series capacitors, and the shunt resistor is one of segmented, programmable, and a combination thereof, and wherein an impedance value of the at least one of the two series resistors, the two series capacitors, and the shunt resistor is selectable after being fabricated on the circuit substrate.

B4 36. (Currently Amended) The unit of claim 34³⁵ wherein the switch module comprises:

a circuit substrate; and

a plurality of transmission lines coupled to the substrate;

wherein the passive network is fabricated on the substrate.

37. (Currently Amended) The unit of claim 35³⁶ wherein the ~~switching~~switch module further comprises an amplifier section having a predefined amplifier frequency response and wherein the passive network provides a predefined precompensation frequency response tuned to a defined correspondence with the predefined amplifier frequency response.

38. (Cancelled)

39. (Currently Amended) The unit of claim 35³⁶ wherein the switch module comprises a first set of transmission lines and a

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second set of transmission lines orthogonal to the first set of transmission lines, and wherein the passive network is coupled to selected ones of the first set of transmission lines.

40. (Previously Presented) The unit of claim 39 wherein the transmission lines are differential transmission lines.

41. (Cancelled)

42. (Currently Amended) The unit of claim 3541 further comprising an impedance corresponding to the predefined capacitance value at a first corner frequency being approximately equal to an impedance corresponding to the predefined series resistance value and the impedance corresponding to the predefined capacitance value at a second corner frequency being approximately equal to an impedance corresponding to the predefined shunt resistance value.

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43. (Previously Presented) The unit of claim 42 further comprising the impedance corresponding to the predefined capacitance value being greater than the impedance corresponding to the predefined series resistance value at low frequencies generally less than the first corner frequency, and the impedance corresponding to the predefined capacitance value being greater than the impedance corresponding to the predefined shunt resistance value at high frequencies generally greater than the second corner frequency.

44. (Cancelled)